



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,527	09/04/2001	Arkady Nikitin		2671

7590 01/03/2003

Ilya Zborovsky
6 Schoolhouse Way
Dix Hills, NY 11746

EXAMINER

LE, JOHN H

ART UNIT	PAPER NUMBER
----------	--------------

2863

DATE MAILED: 01/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/945,527

Applicant(s)

NIKITIN, ARKADY

Examiner

John H Le

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 and 5 is/are rejected.
- 7) ☒ Claim(s) 2-4 and 6-11 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because the abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. Correction is required. See 37CFR 1.72.
2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
3. The disclosure is objected to because of the following informalities:
Page 7, "DNL(I+1) = + {P(I)-P(I)}" should change to -- DNL (I+1) = + {P'(I)-P(I)}--.
Page 8, line 2, "DNL(k)" should change to -- DNU(k)--.
Page 8, line 16, before " is a correct, true value", insert --P(I+1) --.
Page 16, line 8, "DNL(k)" should change to -- DNU(k)--.
Page 18, line 17, "INL(X- $\sum \delta X$)" should change to -- INL(X= $\sum \delta X$)--.
Appropriate correction is required.

Drawings

4. The drawings are objected to under 37 CFR 1.84 for the reasons set forth by the draftsman. See attached PTO-948 form for details. Correction is required.

Claim Objections

5. Claims 1 and 5 are objected to because of the following informalities:

Claim 1, line 24, " $DNL(I+1) = \pm \{P(I)-P(I)\}$ " should change to -- $DNL(I+1) = \pm \{P'(I)-P(I)\}$ --;

line 37, " $DNL(k)$ " should change to -- $DNU(k)$ --;

line 41, " $I=J\pm$ " should change to -- $I=J \pm 1$ --;

line 51, before " is a correct, true value", insert -- $P(I+1)$ --, " $P(1)$ -" should change to -- $P(1)$ --;

line 52, "assumption" should change to --summation--;

Claim 5, line 26, after "microscope;", insert --and--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. Claims 1 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 50, the formula $P(I+1) - P(1) + \sum DNU(k)$, is it correct ?

Claim 5, line 22, $DNL(X+\delta X, X)$, P' , and P are not defined; line 28, $DNL(K)$ is not defined.

Allowable Subject Matter

7. Claim 1-11 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

The following is an examiner's statement of reasons for allowance:

Art Unit: 2863

Regarding claim 1, none of the prior art of record teaches or suggests the combination of a method of determination of true non-linearity of scan along a selected direction X or Y in scan microscope, wherein calculating of a differential nonlinearity of scan along the selected scanning direction in accordance with the expression

$$DNL(I+1,I) = \pm \{P'(I)-P(I)\}$$

wherein $DNL(I+1,I)$ is a differential nonlinearity of scan on a portion of a field of view with number $I+1$ relative to the portion with number I , $P'(I)$ is an average pitch with number I measured in accordance with the second, shifted one dimensional profile $P(I)$ is an average value of the same pitch with I measured in accordance with the first, initial one dimensional profile, with selecting a plus sign if a displacement was performed along the scanning line and minus sign if the test object was displaced opposite to the movement of the probe along the scanning line, with I from 1 to N wherein N is a number of fixed pitches along the line of scanning;

calculated an integrated nonlinearity along a whole field of view in accordance with the formula

$$INL(I+1) = \sum_{k=1}^I DNU(k),$$

wherein $INL(I+1)$ is an integral nonlinearity of scan on the portion of the field of view with number $I+1$, $DNU(k)$ is a differential nonlinearity on the portion of the field of view with the number k , and performing summation on all portions on the field of view preceding the portion with number $I+1$;

calculating a differential non uniformity of the test object in accordance with the expressions

$$\text{DNU}(I,J) = \pm \{P(I) - P'(J)\} \text{ and } I=J\pm 1,$$

wherein $\text{DNU}(I,J)$ is a differential non uniformity of the pitch of test object on the portion between the pitch with a number I and the pitch with the number J ; $P(I)$ is an average pitch with the number I in the first, initial one dimensional profile, $P'(J)$ is an average pitch with the number J on the second, shifted one dimensional profile, with selection of a plus sign when the displacement was performed along the displacement of the probe and the minus sign where the displacement was performed in an opposite direction; and

calculation of an integrated non uniformity of the test object in accordance with the formula

$$P(I + 1) - P(1) = \sum_{k=1}^I \text{DNU}(k),$$

where $P(I + 1)$ is a corrected, true value of the pitch with number $I=1$, $P(I)$ is a base value of the pitch with number 1; and performing summation on all pitches preceding the pitch with the number $I+1$. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 5, none of the prior art of record teaches or suggests the combination of a method of determination of true non-linearity of scan along a selected direction X or Y in scan microscope, wherein calculating of differential nonlinearity of line scan on a portion of a field of view between two positions of the selected pair of strips according to the equation

$$\text{DNL}(X + \delta X, X) = P' - P ; \text{ and}$$

calculating an integrated nonlinearity of the line scan in accordance with the formula

$$INL(X = \sum \delta X) = \sum_{k=i}^I DNL(k),$$

wherein $INL(X = \sum \delta X)$ is an integrated nonlinearity of scan on the portion with X coordinate equal to a sum of all performed displacements $X = \sum \delta X$, and summing in accordance with a number of displacement of the test object in the field of view of the microscope. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

U.S. Patent No. 5,825,670 merely mentions the nonlinearity of development measuring tools on a basis of scanning probe microscopes reaches several percentage points and various ways of indemnification of these errors caused by nonlinearity of scanning are considered. '670 fails to determine the contribution of the nonlinearity of scan and non uniformity of test object as now recited in claims 1 and 5 of the present invention.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Le whose telephone number is (703) 605-4361. The examiner can normally be reached on Monday to Friday from 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. John Barlow, can be reached at (703) 308-3126. The facsimile number for Technology Center 2800 is (703) 308-5841.

Application/Control Number: 09/945,527
Art Unit: 2863

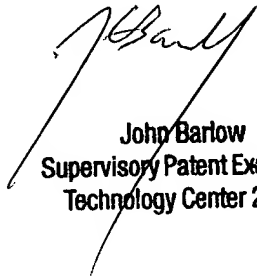
Page 7

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of the Technology Center whose telephone number is (703) 308-0956.

John Le

Patent Examiner-Group 2863

December 27, 2002



John Barlow
Supervisory Patent Examiner
Technology Center 2800